# FRD ACTIVITIES REPORT
# November 2005

## Research Programs

### *Urban Dispersion Program (New York City)*

We have received some initial coordinates from PNNL using a unified GIS database for each sampler, real-time analyzer, and release location used in the UDP project. We are in the process of reviewing these and making corrections. We anticipate having some final positions within a couple of weeks. The mobile real-time analyzer data presents more of a problem. The GPS data are very poor and we may have to rely entirely on operator notes to establish positions for the measurements. We are currently exploring different options and hope to be able to come up with a workable solution soon. (Roger Carter, 208-526-2745, Debbie Lacroix, Jason Rich, and Neil Hukari)

The final bag sampler (PIGS) data set has been reviewed and is waiting for final PNNL location information to add to the data files before release. The bag sampler portions of the report is in the final stages of review and will be completed by the end of December. (Debbie Lacroix, 208-526-9997, and Roger Carter).

The sonic anemometer data recorded from the $SF_6$ tracer release sites were processed and completed during November. The tall buildings and angle of the streets throughout Midtown Manhattan did not allow the sonic to be aligned north during the study. Therefore, an additional horizontal wind shift was implemented when the raw data files were processed. The output files containing QC flags have been carefully reviewed for errors and ready for release. (Jason Rich, 526-9513)

### *ET Probe*

An abstract on the ET probe data was submitted in November for the upcoming 27$^{th}$ Conference on Hurricanes and Tropical Meteorology. It is entitled “In-situ Measurements of 3D Turbulence in Hurricanes Frances and Ivan Using a Pressure-Sphere Anemometer”. Compared with prior ET-probe papers, this paper will focus more on the observations collected by the probes and less on the instrument design. (Richard Eckman, 208-526-2740).

### *Smart Balloon*

A miniature drip counting rain gage has been developed for the smart balloon in an effort to improve the accuracy and decrease the weight of the precipitation gage. The collection funnel is a 1.9 inch diameter plastic lab funnel with a water screen and filter that feeds a small orifice from which a water droplet is formed. About 0.3 inches below the point where the droplets form is an infrared light emitting diode and sensor. As the droplet passes between the emitter and sensor it

refracts the beam causing one or more pulses from the sensor. The pulses are then shaped and counted by a pulse input on the data collection system. Tests indicate that droplet volume formed in this manner varies by only about 3% for precipitation rates ranging from 0.1 to 10 inches per hour. (Randy Johnson, 208-526-2129, and Shane Beard)

## Cooperative Research with DOE NE-ID (Idaho National Laboratory)

### *Emergency Operations Center (EOC)*

A propane leak at the Radioactive Waste Management Complex (RWMC) resulted in the activation of the INL EOC on 8 November. The EOC was staffed by Kirk Clawson for the day-long emergency. A fitting connecting two propane tanks was apparently damaged when one of the tanks unexpectedly slightly shifted position. The leak was not fast enough to trigger the built-in tank catastrophic failure shut-off valve. After studying the situation, the fire department decided to try to tighten the leaking fitting. As they tried to tighten the fitting, it broke, thereby triggering the catastrophic shut-off valve, which stopped the propane leak. FRD provided frequent forecasts particularly of wind direction during very unsettled weather conditions greatly affected by mesoscale storm features. (Kirk Clawson, 208-526-2742)

The remaining NOAA team members of the DOE EOC Emergency Response Organization (ERO) attended their classroom requalification training during November. The purpose of the 2-hour long training was to strengthen and reinforce the INL ERO by an annual review of the lessons learned through the conduct of drills and exercises through the past year. Attendance at the classroom training is required along with the participation in the drills and exercises in order to complete the ERO annual requalification.

FRD staff attended a drill at the INL Emergency Operations Center on 29 November. The drill focused on the Materials and Fuels Complex (MFC), which prior to the INL reorganization was operated by DOE-Chicago as Argonne National Lab-West. The MM5 forecasts generated by FRD were used extensively during the drill to evaluate the potential of a wind-direction shift that could effect the response efforts at INL. (Richard Eckman, 208-526-2740, and Debbie Lacroix)

### *Transport and Dispersion Modeling*

For several years, FRD has been advocating an upgrade to the dispersion modeling that is performed as part of our collaborative work with INL. With the recent INL reorganization, there now appears to be renewed interest in this issue. FRD is investigating the use of the NOAA HYSPLIT model as a potential replacement for the current modeling based on the MDIFF puff model. HYSPLIT has several technical features not found in MDIFF, including deposition and radioactive decay. Moreover, it can directly use the output from FRD's MM5 modeling to create mesoscale dispersion forecasts. The use of this model would also benefit NOAA in that any improvements and research stemming from its use at FRD would feed back to the larger NOAA community using HYSPLIT. (Richard Eckman, 208-526-2740)

## Other Activities

### *Papers*

Eckman, R. E., 2005: In-situ Measurements of 3D Turbulence in Hurricanes Frances and Ivan Using a Pressure-Sphere Anemometer. Submitted to the 27th Conference on Hurricanes and Tropical Meteorology.

Talbot, R., H. Mao, D. Troop, B. Moore, R. Johnson, S. Businger, 2005: Smart Balloon Observations over the North Atlantic: Part I – Mini-O3 Sensor Sampling of Urban Plumes. *J. Geophysical Research - Atmospheres.* Submitted for ARL review.

Mao, H., R. Talbot, D. Troop, R. Johnson, S. Businger, 2005: Smart Balloon Observations over the North Atlantic: Part II – O3 Data Analysis and Modeling. *J. Geophysical Research - Atmospheres*. Submitted for ARL review.

Businger, S., R. Johnson, R. Talbot, 2005: Scientific Insights from Four Generations of Lagrangian Balloons in Atmospheric Research. *Bulletin of the American Meteorology Society.* Submitted for ARL review.

### *Safety*

In lieu of a safety video this month, a surprise safety inspection was done of all offices, the laboratory and the warehouse. A summary of the findings was completed and distributed to all staff members. (Debbie Lacroix, 208-526-9997, and Kirk Clawson)

An unsolicited document review of NOAA's new Incident Investigation Program (NIIP) manual was done. A multitude of errors were reported to the document's author for review. (Debbie Lacroix, 208-526-9997)

### *Travel*

Brad Reese and Shane Beard traveled to Logan, UT, November 6-10, 2005.

### *Training*

Brad Reese and Shane Beard attended the Campbell Scientific training "CR1000/Logger Net" in Logan, UT November 7-10, 2005.

### *Personnel*

The vacancy announcement for a Meteorologist ZP-III closed November 17. We should receive the qualified applications from Boulder Human Resources in early December.